

**FY17 National Seabird Program Awards
NOAA National Marine Fisheries Service**

Seabird Cable Strike Mitigation Workshop

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Seabirds congregate around trawlers to feed on offal putting them at risk of colliding with cables that run aft of trawlers (trawl warps and data cables). Cable strikes are a known source of seabird mortality, particularly on at-sea factory trawlers. Research projects observing seabird cable strikes in the Alaska catcher/processor fleet



Photo credit: L. Shiosaka, A-SHOP 2016

targeting pollock in the Bering Sea and in the West Coast at-sea hake fishery have been conducted. Data from both studies indicate that the estimated mortalities for cable strikes are much greater than the observed mortalities collected as part of typical observer duties. To address this issue, NOAA Fisheries will host a 2-day workshop on gear modification strategies for reducing seabird bycatch in West Coast trawl (hake) fisheries. The workshop will be held November 7-8, 2017 in Seattle at the Alaska Fisheries Science Center. The goal is to develop mitigation strategies that reduce cable strikes and could be used by both the West Coast hake and Alaska pollock trawlers. This collaborative workshop will bring together the at-sea processing industry, engineers, biologists and fisheries managers to develop innovative, practical gear-modifications for reducing seabird cable strike mortality.

Illustrating a Seabird Handling Guide

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Hawaii longline fisheries sometimes interact with seabirds, primarily North Pacific albatrosses. In 2015, NMFS observers recorded 132 birds caught in the deep-set (bigeye tuna) fishery (20% of fishing trips observed) for about 9.4 million hooks set; of these, 19 were released injured and

113 were dead. In the shallow-set (swordfish) fishery (100% of trips observed), observers documented 81 birds caught for about 1.3 million hooks set: 65 injured and 16 dead. Federal regulations require Hawaii longline fishing vessels to practice certain seabird avoidance and handling measures (50 CFR 665.815). These requirements have reduced the seabird interaction rates by approximately 74% in the deep-set fishery, and 91% in the shallow-set fishery.

Setting longline gear at night is a very effective measure for avoiding seabird interactions in the shallow-set fishery. Most interactions in this fishery (75%) occur during the haul, when birds are more likely to be foraging. Many of these birds are retrieved alive (80% in 2015) because fishermen retrieve the birds shortly after they are caught. Almost all of the seabirds retrieved alive (99%) were either black-footed albatrosses (*Phoebastria nigripes*), or Laysan albatrosses (*P. immutabilis*).

Albatrosses are large birds with large wingspans; their size and strength can make handling the birds and removing fishing gear a challenge. The NMFS Pacific Islands Regional Office recently developed a user-friendly guide for longline vessel owners, operators, and NMFS observers. This project will support the illustrated guide with systematic procedures for safe handling and release of hooked or entangled seabirds. The guide is also designed to be understood easily by non-English speakers. NMFS will include the guide in seabird handling kits for longline fishing vessel owners and captains, and will use it when training NMFS observers.



Black-footed Albatross, Photo credit: NOAA Fisheries

Quantifying Unobserved Seabird Bycatch in the At-sea Hake Catcher-processor Fishery

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Seabird mortalities caused by striking trawl warps or the data transponder cable (a.k.a. 3rd wire) have been recorded in similar at-sea hake processing fleets in both Alaska and the Southern Hemisphere. However, observations of seabird cable strikes by fisheries observers are rare because observer duties prevent them from being present for the majority of strikes.

A pilot project in 2016 monitored hauls on at-sea hake catcher-processor vessels and recorded 120 strikes, 30 of which were classified as "hard" strikes (the potential to cause mortality). Expanding observations to



Black-footed Albatross. Photo credit: Robert L. Pitman

the total daytime towing fleet sector suggests up to 738 hard strikes of Black-footed Albatross. If 12% of hard strikes resulted in mortality, up to 85 Black-footed Albatrosses may have been bycaught in the 2016. To address the need for bycatch estimates to include mortalities from 3rd wire strikes, we will outfit observers with project-specific equipment and supplies. This will, in turn, allow us to a) systematically quantify seabird cable strikes, b) gauge the potential for mortality based on individual fate assessment after cable interaction, and c) incorporate observer-recorded data on factors that may influence cable-strike probabilities (*e.g.*, bird density, offal plume presence, etc.) to develop model-based estimates of cable strike mortality. In the longer term, we will collaborate with industry to develop workable mitigation solutions to seabird bycatch resulting from cable strikes in this fishery.

Seabird Communities and Ocean Conditions During the Winter Downwelling Season in the Northern California Current

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Surface waters of the northern California Current Ecosystem have limited winter productivity due to reductions in daylight hours and nutrient-rich upwelling. Seabirds are thought to be more vulnerable to climate-driven starvation during winter because they are likely to be food-stressed at that time. Mass starvation events of Cassin's auklets (*Ptychoramphus aleuticus*) and common murrelets (*Uria aalge*) during a marine heat wave in 2014/2015 are recent examples of such vulnerability. Winter ecology of seabirds in coastal Oregon and Washington is not well-described, in part because few survey vessels are active during the months of November–March. Describing winter species composition, locations of high abundance or diversity, and winter habitat characteristics are first steps to improving understanding of winter ecology in this area.



Parakeet Auklet (*Aethia psittacula*) - photo by R. Merrill

This project will compile and analyze 2006–2015 winter/spring seabird survey data collected by the Northwest Fisheries Science Center from NOAA vessels. The three objectives are to (1) compile summaries of community composition during November to early April; (2) generate maps of seabird sightings and identify regions with high abundance or high diversity, and (3) perform a multivariate analysis with available oceanographic variables to describe seabird associations with winter ocean conditions.

Information generated directly supports two focal areas of the National Seabird Program, namely: (1) promoting seabirds as ecosystem indicators, and (2) supporting the 2012 NMFS-USFWS Memorandum of Understanding on Migratory Bird Conservation. Regions we identify as having high seabird abundance or diversity will serve as ecosystem indicators for times and places where underlying oceanographic processes are fueling the winter food web. The NMFS-USFWS MOU specifies that maintaining biological integrity of coastal marine ecosystems requires data on baseline community composition and species distributions. This project will make direct data contributions to the inventory of seabirds in the coastal environment (MOU Section V-A4, (i) and (ii)).

Pushing the Limits on What Can Be Learned from a Small Amount of Data

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Sets that catch seabirds make up a small component of observed effort in the U.S. North Atlantic pelagic longline fishery, as in most longline fisheries, and, of the sets that do catch seabirds, most catch only one; so, creating statistical models for estimating the total seabird bycatch of the fleet is challenging. Building on the previous work of Li and Jiao (2013) with random-year delta GLM models, Can Zhou and Yan Jiao at VT have developed a new delta approach that addresses not only the low proportion of positive sets (i.e., sets that catch seabirds) in longline data, but also the proportion of singletons within them. This approach substitutes a modified CMP

distribution for the log normal distribution in the sub-model for positive sets. A generalization of the Poisson distribution, the CMP has an additional shape parameter (K) that allows it to model either over-dispersion or under-dispersion and thus accommodates altering the shape of the distribution to fit a higher probability of singletons. Bayesian methods also were used to better estimate uncertainty and facilitate further model development to address rare seabird bycatch observation. This approach was used with longline logbook data to estimate total and annual fleet seabird bycatch from 1992 to 2016. The method could be used to analyze data on other rare bycatch such as whales, turtles, and species of sharks and other fish.



Pomarine jaeger caught on camera by pelagic longline observer in southeastern Gulf of Mexico, April, 2014. Another jaeger species (parasitic) was identified in Gulf of Mexico pelagic longline bycatch in December, 2012.

Distribution and Abundance of Seabirds in the Hawaiian Archipelago: Continuing a Time Series

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NOAA Fisheries' focus on seabirds is associated with two overarching goals: 1) mitigate bycatch, and 2) promote seabirds as ecosystem indicators, each a direct result of emerging agency priorities and statutes to which we respond

(<http://www.st.nmfs.noaa.gov/protected-species-science/other-protected-species/national-seabird-program>).

Seabird data collected at sea aboard NOAA research vessel surveys addresses both of these goals.

1) Data on abundance and distribution is necessary to identify which species are



Great Frigatebird. Photo credit: Robert L. Pitman

vulnerable to bycatch, to quantify where and when, and to develop risk assessment and bycatch mitigation strategies. 2) Seabirds are excellent indicators of ecosystem status. As highly migratory, near-apex predators, seabirds integrate across trophic levels, space, and time, and are easily studied relative to other marine species. Their abundance, distribution, and temporal patterns can provide valuable insights into ecosystem status. From July through December 2017, seabird data will be collected in waters within the Exclusive Economic Zone of the Hawaiian Archipelago, as part of a cetacean and ecosystem assessment survey conducted aboard NOAA research vessels SETTE and LASKER (<https://www.pifsc.noaa.gov/hiceas/>). This represents the third such survey; (the previous two were conducted in 2002 and 2010). Strip transect methods for seabirds, and line transect methods for seabird feeding flocks will result in two datasets that can be added to the time series. In addition to fulfilling NOAA Fisheries objectives, these seabird data will provide the first comprehensive dataset for the Papahānaumokuākea Marine National Monument (PMNM) since its expansion. PMNM is home to more than 14 million birds living in what is collectively the largest tropical seabird rookery in the world. Funding from NOAA Fisheries will be heavily leveraged through partnerships with two additional Federal agencies, Bureau of Ocean Energy Management, and U.S. Navy, both of which are providing significant funding for this survey.

Pacific Seabird Bycatch Necropsy Program

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In this program, observers in Alaska, Hawaii, and US West Coast fisheries collect seabirds from the bycatch and other vessel interactions, with special focus on procellarids. Birds are forwarded to Oikonos, co-located with the Marine Wildlife Veterinary Care and Research Center, Santa Cruz, CA. This project has been going on for several years and makes important use of bycatch seabirds, providing a scientific collection that is incomparable to any we know of. Data can be used to refine estimates of the impacts of bycatch on populations, provide ecosystem modeling information, and monitor changes in the marine environment. Several items noted as high priority in the FWS Laysan and Black-footed Albatross Conservation Action Plan can only be addressed through this project. Many of the results directly apply to collaborative work between NOAA Fisheries and the FWS. This program has been in place since 2007 and represents a valuable time-series of seabird data in support of a variety of activities. To date, over 2,500 birds have been examined and another 250 are being processed in FY15.



Black-footed Albatross. Photo credit: NOAA Fisheries

Birds are necropsied and a broad suite of data collected. Additionally, feather clips are made for stable isotope samples, and the stomachs are examined for plastics and the natural food items were then shipped back to the AFSC for the food habits project

Significance (with special focus or relevance to one or more of NOAA Fisheries' NSP focus areas and/or directives):

- 1) *Mitigation of Seabird Bycatch*: Although this project does not specifically address mitigation measures, the data can be used to understand population-level impacts by fisheries on populations or sub-populations and thereby help to target limited resources available for mitigation research.
- 2) *Promoting Seabirds as Ecosystem Indicators*: The data support population dynamics studies and the food habits information is especially important for developing and improving marine web food habits studies.
- 3) *NMFS-USFWS MOU on Migratory Bird Conservation*: As with many other AFSC-led seabird projects, this work addresses the MOU in many ways. It is especially useful in response to high priority action items in the Albatross conservation action plan. The FWS is viewed as our primary client in this work but data are important to many NMFS activities to better understand and steward ocean resources.

Seabird Training for Alaska Groundfish Observers

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The USFWS and NOAA's Alaska Fisheries Science Center (AFSC) worked closely during the high seas driftnet program, 1989-1993 to provide seabird training to observers. Based on this collaboration, observer duties in the AFSC North Pacific Groundfish Observer Program were expanded to include seabird observation and bycatch monitoring. Fitzgerald of the AFSC and Dr. Patrick Gould of the USFWS worked together to develop supporting materials for observers, including species ID training. Species ID was especially important due to the rare bycatch of the endangered Short-tailed Albatross and was included as a requirement in the Biological Opinion.



Wedge-tailed Shearwater. Photo credit: Robert L. Pitman

Seabird responsibilities for observers were implemented in 1993. NSP funds will be used to train observers through the Coastal Observation and Seabird Survey Program at the University of Washington trains observers. The goal is to achieve consistency and reliably provide seabird training, and to provide high quality training to more than 400 observers per season. Provision of this training allows for good reliability in the seabird data collected, especially where it

concerns any bycatch events of the endangered short-tailed albatross. An added benefit of COASST's involvement is their ability, at no extra charge, to organize unpaid student interns to assist with other seabird studies such as data entry or preparation of specimens.

Significance (with special focus or relevance to one or more of NOAA Fisheries' NSP focus areas and/or directives):

- 1) *Mitigation of Seabird Bycatch:* In all mitigation work we do in Alaskan waters large sample sizes are necessary. The work often complements observers already deployed to the vessel or brought on board under a special contract. Also, it is important to review observer data catch rate information to better understand where the greatest conservation need is among the many commercial fishing sectors.
- 2) *Promoting Seabirds as Ecosystem Indicators:* North Pacific Groundfish and Halibut Observers collect a broad suite of bycatch and fishery interaction data and also collect birds for the necropsy program. Some of these results support seabirds as ecosystem indicators studies.
- 3) *NMFS-USFWS Memorandum of Understanding on Migratory Bird Conservation:* The AFSC has built collaboration and client service to the FWS since the 1970's, and especially through the High Seas Driftnet and the Groundfish observer programs. The high quality of training provided to observers was established through this cooperation, and the derived from observer data serve the continued collaboration in many ways. Annual reports are provided to the FWS on total seabird bycatch estimates and the FWS provides input each year on their needs.